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IMPORT QUOTAS AND THE AUTOMOBILE INDUSTRY: THE COSTS OF PROTECTIONISM
A STUDY BY ROBERT W. CRANDALL OF THE BROOKINGS INSTITUTION*

Summary

The Reagan administration must soon decide whether to lobby Tokyo for a fifth year of restrictions on exports of Japanese cars to the United States. In developing a consensus on this difficult issue, U.S. trade policymakers will have to weigh the costs of the restraints to consumers in terms of higher prices for both American-made and imported cars against the effects of continued protection on the financial condition of domestic automotive manufacturers and on employment opportunities for workers. In the following article, Robert W. Crandall, a senior fellow in the Economic Studies program at The Brookings Institution, examines this trade-off.

Introduction

The American automobile industry had a very good year in 1983: New car sales jumped up by nearly one million units, and, as has been well-publicized, after-tax profits soared to a record $6.2 billion. But the industry is not quite as robust as these statistics suggest. U.S. automobile companies have been playing with a home-field advantage -- quotas on Japanese imports, negotiated in 1981 and now extended through 1985.

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This article explores the effects of the quotas -- on automobile prices and on the profits of domestic manufacturers. The essay begins, however, by tracing the recent history of the automobile industry; it is important, in assessing the impacts of the quotas, to understand why they were sought in the first place.

The Past as Prologue

Sales - Before the 1958 recession, the U.S. automobile industry appeared to be a stable, invincible oligopoly. From time to time, ardent trustbusters would suggest that the government should initiate antitrust proceedings against General Motors [Corp.] in order to increase competition in the industry. It seemed highly unlikely that foreign producers would ever be able to capture a substantial share of the U.S. market. Although Volkswagen enjoyed some success in the late 1950s, import sales then tapered off -- dropping below five percent of total sales by 1962, as Table 1 indicates.

That decline proved to be short-lived; in the next eight years, the proportion of U.S. sales accounted for by imports tripled, settling at about 15 percent for the years 1970-74. Ford [Motor Co.] and General Motors responded to the stepped-up competition from small imported cars by launching their Pinto and Vega model lines, but neither of these proved particularly successful. When the second oil shock occurred in 1978-79, fuel-efficient foreign cars became more popular than ever; in 1980, 28 percent of the new cars registered were imports.

While the sales of imports have increased since 1965, growth in the demand for new cars has decreased. From 1965 through 1970, sales were essentially flat, deviating little from an annual rate of nine million cars; this leveling-off came after more than a decade of substantial sales growth. Sales were at a higher plateau between 1971 and 1979, averaging about ten million cars per year, but most of this increase was absorbed by imports, particularly those from Japan. As a result, even during the relatively prosperous period of 1976-79, the demand for domestic cars was about the same as it had been in 1965-66. That demand then plummeted during the first four years of the 1980s, as U.S. manufacturers managed to sell only about 6 million new cars per annum -- far below their totals in the recession-plagued years of 1970 and 1975.

As Table 2 shows, the profit rates of U.S. automobile manufacturers fluctuated wildly during the 1970s, ranging between 6.1 percent and 18.7 percent on equity. Then, in 1980, the bottom fell out; the firms lost $4 billion on sales of 6.3 million cars. This was the worst year in the industry's history; its profit rate of -9.3 percent was 23.2 percent below the average for all manufacturing. When sales had declined sharply in 1970 and again in 1975, U.S. manufacturers had managed to earn positive rates of return. In 1961, with sales of only 5.2 million cars, the companies had earned 11 percent on equity. Clearly, the industry's difficulties in 1980 -- and in the two years that followed -- reflected more than just cyclical swings in the economy. What had gone wrong?

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Regulation - One source of vexation has been the federal government, which has saddled the industry with a succession of new regulatory requirements. Safety regulation began in 1966, federal emissions controls in 1968, and fuel-economy regulation in 1978. The costs of safety and emissions regulation have been substantial; as Table 3 shows, they reached nearly $2,000 per car by the early 1980s.

Prior to 1972, emissions control costs were negligible, and safety equipment costs were less than $200 per car. Both categories of costs then rose sharply, however. Automobile manufacturers struggled with the technology of emissions control while trying to convince the government that its timetable for control was much too stringent. For at least two years and perhaps longer, the companies used relatively inefficient fixes to constrain emissions. The results were poor performance, severely depressed fuel economy, and widespread dissatisfaction.

At about the same time, the Department of Transportation was imposing two major new safety regulations on the industry -- requirements for seat belt interlocks and energy-absorbing bumpers. The interlock requirement was quickly repealed by Congress in response to bitter complaints from new-car buyers, but manufacturers had already spent time and money on the design and fabrication of interlock systems. The bumper requirement was surely a masterstroke of bad timing; it added substantially to the weight of cars -- and detracted significantly from their fuel economy -- just as the Arab oil embargo was driving gasoline prices up.

The second big regulatory surge came in 1980-81. The industry managed to stave off a new requirement for passive occupant restraints, but only at the last minute. Product planners had to be prepared to install passive seat belts or air bags in some models in 1982 before the Department of Transportation relieved them of this requirement in mid-1981. In addition, emissions standards were tightened substantially in 1980-81, necessitating major changes in ignition systems and control devices.

Unfortunately, these regulatory initiatives came right after the second oil shock and an attendant surge in the sale of Japanese imports. At the same time that U.S. manufacturers were struggling to redesign and downsize their cars as quickly as possible, they had to introduce new emissions-control technologies and to develop passive restraint systems. The Japanese car companies appear to have adjusted to the regulatory requirements more readily than their American rivals, perhaps because they did not need to downsize their product lines simultaneously.

The safety regulations and the pre-1980 emissions controls appear to have been effective, but the gains they produced have not been without their costs. For consumers, safety and emissions standards have increased the prices of new cars by at least $1,000 and reduced both fuel economy and performance. As a result, they have reduced the demand for new cars. Had emission controls been kept at 1979 levels and the energy-absorbing bumper left a matter of market choice, new car sales would have been higher and regulatory headaches fewer for an increasingly besieged Detroit.

More recently, the Corporate Average Fuel Economy (CAFE) standards, legislated by Congress in 1975 and implemented by the Department of Transportation, have placed U.S. companies in the difficult position of trying to meet the resurgent demand for larger cars while still making progress towards the 1985 goal of 27.5 miles per gallon for their fleets.

Product Quality - An unfortunate consequence of the turbulence of the 1970s was a sharp decline in the product quality of U.S. automobiles relative to that of Japanese imports. This decline was reflected not only in the "fit and finish" of cars -- that is, the fit of body panels and the general quality of exterior finish -- but also in the frequency of repairs. In 1970, as Table 4 shows, the repair records of U.S. cars were only marginally worse than the records of Japanese imports in the first few years of service. These differences may have narrowed or disappeared in later years of service. By 1976, however, Japanese cars had much better repair records than their American counterparts -- and this gap has persisted and even widened in the years since then. It should be noted that the continuing declines in quality reported in Table 4 are not confined to the new downsized front-wheel drive models, but have occurred across the entire model lines of the U.S companies.

Production Costs - The quality advantage of Japanese cars was no doubt one factor in the shift of American buyers toward imports; another factor was the loss of U.S. competitiveness in the production of smaller cars. Since 1980, there have been numerous attempts to quantify the differences between U.S. and Japanese production costs for subcompact cars. Estimates of the Japanese advantage range from $1,300 to $2,500 per car, a substantial fraction of the average delivered price of these models. Those who have studied this question agree that the main sources of the cost disparity are differences in wage rates, labor productivity, management practices, and inventory costs.

Part of the U.S. industry's problem derives from its own collective bargaining; it has granted large wage increases to its unionized workers rather than risk strikes or labor unrest. As indicated in Table 5, the result has been hourly employment costs that are about 60 percent above the average for all U.S. manufacturing firms. In Japan, by contrast, automobile companies pay their workers only 25 percent more per hour than what the average Japanese industrial worker receives. Moreover, the differences between the hourly employment costs of U.S. and Japanese car manufacturers has been widening -- from about $6 in the mid-1970s to about $11 now -- even though productivity growth in the Japanese firms has been more rapid.

The surge in demand for Japanese imports was followed by a sharp upturn in the value of the dollar. From the beginning of 1980 through the third quarter of 1982, the dollar appreciated against the yen by more than 30 percent. Even today, the value of the dollar in terms of the yen is 20 percent higher than it was in January 1980. This depreciation of the yen has added considerably to the Japanese cost advantage over U.S. automobile producers.

Paying for Protection: The Import of Quotas

In 1980, the U.S. industry began to appeal for temporary protection from Japanese imports. In July 1980, the International Trade Commission [ITC] initiated an investigation under Section 201 of the Trade Act of 1974. This

proceeding did not result in an ITC decision to recommend trade relief measures. In 1981, however, President Reagan announced that agreement had been reached with Japan on a voluntary export restraint (VER) that would limit Japanese automobile exports to the United States, beginning that April, to 1.68 million cars per year.

The Reagan decision did not arouse much opposition since it followed a year in which U.S. automobile manufacturers lost approximately $4 billion. Employment in the industry had fallen by more than 20 percent; approximately a third of that decline was due to a sharp rise in import sales. Moreover, Chrysler Corp. had recently been saved from bankruptcy by federal loan guarantees, and Chrysler workers had taken substantial pay cuts.

The voluntary export restraint negotiated with Japan was renewed in 1983 for the 1984-85 period, but with a slightly higher limit of 1.85 million cars per year. By 1983, however, the industry had returned to at least the appearance of financial health, generating more than $6 billion in after-tax profits. The price of Japanese cars surged, U.S. manufacturers paid substantial bonuses to their executives, and commentators began to question the wisdom of continuing the restraint agreement with Japan.

The Rationale - The Reagan administration obtained temporary quotas on Japanese imports in order to buy the U.S. automobile industry and its workers time to adjust to the new rigors of world competition. It anticipated that during this adjustment period, car companies might undertake the substantial tooling required for the manufacture of new models, launch major investment programs designed to lower production costs in existing plants, establish new plant configurations, reduce inventory costs, and seek changes in union work rules and wage agreements. After a few years, the industry would be able to compete effectively once again -- unless its cost disadvantages were rooted in fundamental economic forces beyond its control, such as exchange rates, raw material costs, or a shift of comparative advantage to lower-wage countries.

There was and is another possible outcome: Trade protection might simply provide an opportunity for increases in automobile prices, wages, and company profits. A reduction in the availability of imports inevitably increases the demand for U.S. automobiles, opening the door for price hikes. The resulting increases in profits could provide an enticing target for union negotiators in the next round of bargaining. With foreign competition temporarily (or permanently) reduced, workers have less incentive to moderate their wage demands or to allow fundamental changes in work rules.

Which of these outcomes seems more likely? Past experience with trade restrictions hardly suggests that they offer a guarantee of industrial renaissance. The steel industry has enjoyed some form of protection over most of the past fifteen years, but it has not recovered. Trade protection for manufacturers of television receivers or shoes has hardly returned the United States to a dominant position in these industries. If past experience is any guide, one should not expect the Japanese VERs to be a miracle cure for the U.S. automobile industry.

The Industry's Adjustment - In fact, U.S. companies had begun to adjust to the new world of high gasoline prices and international competition some

time before the VERs took effect. There is every reason to believe that the industry was well on its way to renewed competitiveness. Manufacturers had focused more on small cars since the two oil shocks, and by 1981 had reduced the average weight of a domestic car 30 percent from its 1972-73 high. Similarly, by 1980 the industry was selling 40 percent of its cars with four-cylinder engines, up sharply from 9 percent in 1972-73. Fuel economy was up by more than 25 percent over what it had been in 1972-73 for cars of the same weight and horsepower; actual fuel economy increased much more than that, as buyers shifted to smaller cars.

The investment expenditures of the automobile companies are further evidence of their pre-1981 adjustment efforts. Between 1975-76 and 1979-80, as Table 6 shows, real investment outlays increased by more than 88 percent. More focused census data show that investment in plant, equipment, and special tooling rose more than 87 percent over the same period. In short, the industry had invested enormous sums in new models before the establishment of quotas. Since 1981, real investment expenditures by the automobile industry have fallen by 30 percent. Buyers have begun once again to demand larger cars; eight-cylinder cars accounted for 31 percent of 1983 sales, up from 24 percent in 1981. New or modified models abound: Ford has introduced a new series of front-wheel drive cars and a modified version of its older rear-wheel drive Thunderbird; Chrysler has added a new sports car and a series of vans to its product line; and General Motors has downsized its larger cars. But the major changes were in place before the quotas were; by March 1981, Ford's Escort, Chrysler's Aries-Reliant, and General Motors' X-, J-, and A-body cars were either on the market or nearly ready for introduction. It is difficult to trace any differences in product offerings to the quotas.

Nor has productivity soared as a result of the quotas. Between 1977 and 1982, productivity growth in the motor vehicle industry was 0.4 percent, as compared with 0.2 percent in the nonfarm business sector. From 1980 to 1982, the industry outperformed the rest of the nonfarm business economy, but, given the depth of the 1982 recession, it is difficult to draw any firm conclusions from these data. In 1982, the UAW [United Auto Workers Union] agreed with Ford and GM to forego some wage increases in order to stem the flow of red ink from these companies' domestic financial statements. These agreements followed similar, but larger, concessions granted to Chrysler in previous years. In addition, the industry has attempted to increase productivity by investing in labor-saving equipment and improving worker morale. At this juncture, there is insufficient evidence to judge the success of these attempts. Indeed, General Motors' decision to produce subcompacts jointly with Toyota [Motor Corp.] in California appears to be an attempt to break out from the restrictive work rules with which it is saddled in other plants. When 1983 data become available, we may be able to say a little more about the impact of these efforts.

Effects on Automobile Prices - There is no doubt but that by creating an artificial scarcity of Japanese imports, the voluntary restraints have increased the prices charged for these cars; the only question is by how much. A 1983 Wharton Econometrics study estimated that as a result of the quotas, the prices of Japanese imports jumped up an average of $920 to $960 per car in 1981-82 alone. With the surge in demand that took place in 1983, this price effect has surely increased substantially -- which means that our assistance

for the U.S. industry has benefited Japanese producers and their dealers by at least $2 billion per year in price enhancement. From the standpoint of American taxpayers, a tariff clearly would have been a better policy choice than the voluntary restraints.

The effect of the restraints on the prices of U.S. cars is more open to dispute. It is not easy to estimate this effect because the mix of automobiles is constantly changing. Indeed, some industry officials believe that any recent price increases above the cost of producing cars have been due to mix changes, not imports. But if the VERs reduce the potential supply of new Japanese cars in the United States (and they surely do), they must increase the demand for American automobiles. Historically, the average price of automobiles in the United States has varied directly with the strength of demand; therefore, one would expect the VERs to increase the prices of domestic cars.

Assume for a moment that the VERs have simply increased the U.S. industry's market share by 5 to 8 percent, without increasing prices; given the trend in import sales between 1978 and 1981, this range probably represents the maximum effect of the quotas on market shares. In 1983, a 5 to 8 percent shift would have meant the purchase of an additional 445,000 to 712,000 domestic cars, assuming no effect on total car sales. My current research suggests that the marginal profit on these cars, before taxes, would have been about $2,000 per car -- for a total of $0.89 to $1.42 billion, less than the gain realized by Japanese companies and their dealers. (Of course, if the VERs have increased domestic car prices, then the additional profits made by U.S. manufacturers would be substantially higher.)

I used several techniques to estimate the impact of the quotas on domestic car prices, and while I would not claim that the result of any one of the tests are definitive, the fact that the outcomes are so similar does suggest that the price effect of the quotas is in the range indicated.

One way to gauge that effect is to relate U.S. car prices to costs and demand over a substantial period of time and then to use the resulting equation to predict prices under the VERs in 1981-83. I developed a pricing model for the period 1961-80, incorporating labor costs, capital costs, regulatory requirements, the price of steel, the strength of demand, and dummy variables for years of price controls. As indicated in part 1 of Table 7, the model tracks the annual average prices of new cars in this 20-year period with an average error of only about $56. However, the equation underestimates prices for 1983 by more than $800 per car and for 1981-83 by a yearly average of $430. Since the model was built using the Commerce Department's series on actual transactions prices, it reflects discounts from list prices. It does not, however, standardize for changes in the mix between small and large cars or in the mix of options. These changes occurred in the 1960s and 1970s, and the equation tracked prices very well for those two decades. The only major difference between the 1970s and, say, 1983 is the presence of an import restraint; it seems reasonable to infer that the VER must account for a substantial share of the excess of actual prices over predictions.

A second method for analyzing shifts in automobile prices is the use of a so-called hedonic model that reflects the qualitative attributes of each

car. I gathered data on 176 domestic models tested by Consumer Reports from 1970 through 1983; complete data were available for 172 of these cars. The following factors were included in the model: weight, acceleration, the estimated quality of ride, the estimated handling capability, the cost per mile of gasoline consumed, and the size-class of the car (subcompact, compact, intermediate, full size, or luxury). When specific dummy variables are used for each year, the model estimates that the real list price of small cars increased by 12 percent, or $826 per car, in the 1981-83 period. These increases in the real price of cars, holding the qualitative attributes constant, include the effects of tighter emissions control standards set by the government in 1980-81. These standards added $454 (1982 dollars) to the cost of small new cars, which must be deducted from the estimated increase in the real, quality-adjusted price. Thus, as shown in part 2 of Table 7, the hedonic model estimates that the quotas increased list prices by an average of about $370 per car in 1981-83. This calculation does not reflect changes in dealer discounts and rebates; inasmuch as rebates have narrowed substantially since March 1981, the estimate is undoubtedly biased downward.

Finally, one can assess the impact of the VERs by examining the behavior of the Consumer Price Index [CPI] for new cars since March 1981. Historically, the CPI for cars has risen less rapidly than the total CPI. Part of the reason for this differential is that the Bureau of Labor Statistics deducts estimated improvements in quality -- including regulatory costs -- from price increases for automobiles. The total adjustment for quality improvements in 1981-83 was nearly $850, of which about $700 reflects regulatory costs. Since most other components of the CPI are not similarly adjusted, the new-car CPI should rise less rapidly than the total index, ceteris paribus.

The new-car component of the CPI increased by only 0.3 percent per year in the 1960s, while the CPI as a whole rose by 2.7 percent per year. In the 1970s, the corresponding figures were 5.1 percent and 7.5 percent. But since the inception of import quotas, the difference has narrowed remarkably. From March 1981, through December 1983, the new-car component of the CPI increased by 4.5 percent per year and the overall CPI by 4.9 percent. Had the 0.68 ratio of the 1970s persisted, we would have expected the new-car component to advance only 3.3 percent per year during this period -- 1.2 percent[age point] less than actually observed. If the prices of domestic cars had risen at this lower annual rate, then, as part 3 of Table 7 indicates, they would have been an average of $368 less than they were.

Equally striking is the behavior of the new-car CPI in the period just after the import quotas were introduced. From April through December 1981, the new-car CPI increased at a 10.3 percent annual rate, after rising at a 4.1 percent rate for the preceding 15 months. This surge occurred during a continuing decline in demand.

The various calculations just discussed are likely, for four reasons, to underestimate the impact of the quotas. First, they do not take into account the sizable interest rate subsidies that were offered in 1981. Second, the continued appreciation of the dollar and the improvement in the relative quality of Japanese automobiles would have placed relatively more downward pressure on U.S. car prices in 1981-83 than in previous periods. If there had been no quotas, we surely would have expected U.S. car prices to reflect

increasing import competition. Third, wage rates paid by U.S. automobile producers grew somewhat less rapidly than average U.S. wages in 1980-83, after having increased more rapidly in 1975-80. Absent the quotas, these lower wage costs would have been reflected in new car prices. Finally, with gasoline prices falling since 1982, federal fuel economy standards have undoubtedly led U.S. companies to restrain the prices of smaller cars.

Profits - As a check on these estimates, one might look at the before-tax profits of the companies. If prices increased abnormally relative to costs, profits should have risen relative to their historical relationship with volume. To test for this outcome, I used the Commerce Department's estimate of domestic profits (before taxes) in the motor vehicle industry, adjusted for changes in inventory valuation. Table 8 shows the very strong recovery in pretax profits since 1980. Despite much lower sales volumes, the real profit per domestic vehicle produced has rebounded to 1978-79 levels. In fact, on the sale of fewer vehicles than were sold in 1975, real profits per vehicle in 1983 were more than double what they had been in that earlier year. When before-tax profits, deflated by the CPI, are fitted to total vehicle sales (including trucks and buses), the import share, a dummy variable for the 1973-74 price controls, and a dummy variable for the 1981-83 period, the results show that profits have risen by 50 percent over 1960-80 levels for the same levels of vehicle production. This translates into $280 per vehicle, including large cars, trucks, and buses. Since import restraints have not raised truck and bus prices and have had less of an impact on the prices of large cars than on those of small cars, the effect per small car must have been substantially greater than $280. These increases in profits may have been due in part to productivity gains, but a substantial share of the explanation must be the price effects of import restraints.

Employment - It is difficult to see how the VERs could have shifted more than 8 percentage points of the market from Japanese imports to U.S. cars by 1983. If the higher prices caused by the quotas had no effect on automobile sales in 1983, a market share shift of this magnitude might have saved, at most, 46,200 production jobs in the automobile industry. (A swing of 8 percentage points to U.S. automobiles would have produced an 11 percent increase in domestic sales. Assuming that the elasticity of production workers with respect to output is 0.7, this translates into a 7.7 percent increase in employment on a 1983 average base of 600,000.)

If, as was almost certainly the case, higher prices reduced total automobile sales, the effect on employment was smaller. Quotas appear to have raised prices by an average of about 5 percent, which, assuming a unitary elastic demand, translates into a 5 percent reduction in sales. Absent this reduction, total sales would have been 9.4 million units instead of about 8.9 million. If U.S. producers had obtained a 65.5 percent share of this larger total, their domestic sales would have been 6.0 million units instead of 6.4 million -- and the number of production jobs in the industry would have declined by 26,200. What that cost has been depends upon the extent of relative-price effects, welfare losses in production, and welfare losses in consumption caused by constrained consumer choice. Concentrating only on the price effects, if the average price of U.S. cars has risen $400 and the average price of Japanese imports has gone up $1,000, the cost to consumers in 1983 was $4.3 billion plus additional losses in consumer welfare due to the VERs'

constraint on the choice of cars. The cost per job saved, therefore, was nearly $160,000 per year. Employment creation at this cost is surely not worth the candle.

It is possible that the number of jobs saved was substantially less than 26,200 and that the per-job cost estimate just presented is overly conservative. Falling gasoline prices and the increasing demand for larger cars should have offset some of the rising pressure on small-car sales caused by a depreciation of the yen against the dollar in 1981-83. An eight percentage point shift in market share translates into an import share of 35.5 percent in 1983 without the quotas. This would have required Japanese imports of 40 percent more than the level in 1983. While it is conceivable that Japanese imports would have risen by this much, it seems unlikely; such an increase would have required a very high price elasticity of demand for these cars, little reduction in U.S. auto prices to meet the competition, or both. Without the quotas, it is likely that U.S. automobile prices would have been lower, thus restraining the shift to the Japanese models.

Conclusion

As this article is being completed, the Japanese government is beginning to express support for the restraints on automobile exports to the United States. This support has come as a "surprise" to U.S. trade officials, according to news reports. If the restraints raise the price of Japanese cars in the United States by $1,000 per vehicle or more, the Japanese should be pleased indeed -- unless, of course, a slightly tighter or looser restraint would increase their profits even more.

Given the scant evidence that these quotas are advancing the competitiveness of the U.S. automobile industry, their desirability turns on whether Americans wish to pay large premiums on their cars in order to increase the employment of auto workers at wages far above the manufacturing average. Indeed, because they have produced high profits in the industry, the VERs may actually lead to a widening of this wage differential in the 1984 contract negotiations. If that happens, the political necessity for quotas will increase, and future presidents will have difficulty arguing that the domestic automobile industry should once again face the rigors of international competition.

* * * * * *

Table 1

U.S. New Car Registrations, 1960-83

(in millions of units)

Year	Domestic Cars	Imports	Total	Import Share
1960	6.1	0.5	6.6	7.6%
1961	5.2	0.4	5.6	6.5
1962	6.6	0.3	6.9	4.9
1963	7.2	0.4	7.6	5.1
1964	7.6	0.5	8.1	6.0
1965	8.7	0.6	9.3	6.1
1966	8.3	0.7	9.0	7.3
1967	7.6	0.8	8.4	9.3
1968	8.4	1.0	9.4	10.5
1969	8.3	1.1	9.4	11.2
1970	7.2	1.2	8.4	14.7
1971	8.5	1.3	9.8	15.1
1972	9.0	1.5	10.5	14.5
1973	9.7	1.7	11.4	15.2
1974	7.3	1.4	8.7	15.7
1975	6.8	1.5	8.3	18.2
1976	8.4	1.4	9.8	14.8
1977	8.8	2.0	10.8	18.3
1978	9.0	1.9	10.9	17.8
1979	8.0	2.4	10.4	22.7
1980	6.3	2.5	8.8	28.2
1981	6.0	2.4	8.4	28.8
1982	5.5	2.3	7.8	29.3
1983	6.4	2.5	8.9	27.5

Source: Automotive News, Market Data Book Issue, April 25, 1984

Table 2

After-Tax Rate of Return on Equity: U.S. Motor Vehicle Companies, 1960-83

Year	Motor Vehicles	All Manufacturing
1960	13.5%	9.2%
1961	11.4	8.8
1962	16.2	9.8
1963	16.7	10.2
1964	16.9	11.6
1965	19.5	13.0
1966	15.9	13.4
1967	11.7	11.7
1968	15.1	12.1
1969	12.6	11.5
1970	6.1	9.3
1971	13.0	9.7
1972	14.6	10.6
1973	15.3	13.0
1974	7.0	14.9
1975	6.2	11.6
1976	17.0	14.0
1977	18.7	14.2
1978	17.0	15.0
1979	10.9	16.5
1980	-9.3	13.9
1981	-0.7	13.7
1982	0.9	9.2
1983	16.7	10.1

Source: Federal Trade Commission

Table 3

The Cost per Automobile of Federal Safety and Emissions Regulation, 1966-81

(in current dollars per car)

Year	Equipment Costs			Total Costs*
	Safety	Emissions	Total	
1966	$ 40	$ 0	$ 40	$ 40
1967	73	0	73	73
1968	115	14	129	129
1969	129	15	144	144
1970	157	24	181	181
1971	166	25	191	191
1972	171	25	196	366
1973	258	44	302	790
1974	380	49	429	970
1975	358	119	477	664
1976	373	126	499	696
1977	384	123	507	850
1978	393	133	526	895
1979	421	148	569	980
1980	467	222	689	1,373
1981	494	600	1,094	1,894

*Including maintenance and fuel economy penalty.

Source: Crandall et al, forthcoming study of automobile regulation

Table 4

Average Consumer Reports Quality Ratings for U.S. and Japanese Cars

Year	Japanese Imports	GM	Ford	Chrysler
1970	2.33	2.81	3.18	3.85
1976	1.13	3.03	2.80	3.91
1981	1.05	4.33	3.17	4.50

Note: 1 = Much better than average
2 = Better than average
3 = Average
4 = Worse than average
5 = Much worse than average

Source: Consumer Reports, April 1972, April 1978, and April 1983

Table 5

Total Hourly Compensation in the Motor Vehicle Industry and All Manufacturing - United States and Japan, 1975-83

(dollars per hour)

	United States		Japan	
Year	Motor Vehicles	All Manufacturing	Motor Vehicles	All Manufacturing
1975	$ 9.44	$ 6.35	$3.56	$3.05
1976	10.27	6.93	4.02	3.30
1977	11.45	7.59	4.82	4.03
1978	12.67	8.30	6.85	5.54
1979	13.68	9.07	6.90	5.49
1980	16.29	9.89	6.89	5.61
1981	17.28	10.95	7.65	6.18
1982	18.66	11.68	7.18	5.70
1983	19.02	12.31	7.91	6.24

Source: Bureau of Labor Statistics

Table 6

U.S. Motor Vehicle and Equipment Producers' Gross Investment Expenditures, 1970-83

(in millions of dollars)

Year	Current Dollars	1972 Dollars*
1970	$3,050	$3,341
1971	2,420	2,516
1972	3,000	3,000
1973	3,830	3,630
1974	4,300	3,726
1975	3,350	2,534
1976	3,620	2,612
1977	5,820	3,978
1978	7,215	4,590
1979	8,305	4,862
1980	9,060	4,866
1981	10,078	4,992
1982	7,920	3,777
1983	7,233	3,496

*Using Bureau of Economic Analysis implicit price deflator for nonresidential plant and equipment

Source: U.S. Department of Commerce

Table 7

Three Estimates of the Effect of Quotas Upon U.S. Car Prices

1. Average price of new domestic cars sold = f(labor cost, capital cost, regulatory cost, price of steel, 1972-74 price controls, vehicle sales)

   Period of estimation: 1961-80. Standard error: $56.

   Excess of actual prices over predicted prices:

1981	$237
1982	$236
1983	$829

2. Hedonic Model: Price of a new domestic car = f(weight, ride, handling, acceleration, size class, gasoline cost, dummy variables for various years)

   Period of estimation: 1970-83 models (172 cars).

   Increase in estimated value (per unit) during quota years for small cars:

   Years: 1981-83
   Total: $826
   Additional regulatory costs: $454
   Net Value: $372

3. Annual increase in consumer price index:

Period	1. Total CPI	2. New-Car CPI	Ratio 2/1
1960-70	2.7%	0.3%	0.11
1970-80	7.5	5.1	0.68
March 1981-December 1983	4.9	4.5	0.92
March 1981-December 1983 (at 1970s' ratio)	4.9	3.3	0.68

   Difference in behavior of new-car CPI relative to total CPI in March 1981-December 1983 compared with difference in 1970s:

   4.5% - 3.3% = 1.2% per year.

   Effect on new domestic car prices of 1.2% greater increase per year:

   Actual 1983 Average Price: $10,484
   Predicted 1983 Average Price: $10,116
   Difference: —— $368

Table 8

U.S. Motor Vehicle Industry's Profits Before Taxes*, 1970-83

Year	Before-Tax Profits (billions of dollars)	Before-Tax Profits (billions of 1972 dollars)	Before-Tax Profits per Vehicle** (1972 dollars)
1970	$ 1.2	$ 1.3	$ 160
1971	5.0	5.2	490
1972	5.9	5.9	520
1973	5.7	5.3	423
1974	0.1	0.0	472
1975	1.9	1.5	165
1976	7.2	5.3	461
1977	9.4	6.5	513
1978	8.9	5.7	443
1979	4.7	2.7	235
1980	-3.8	-1.9	-239
1981	-0.6	-0.3	-37
1982	0.9	0.2	27
1983	7.7	3.2	353

*With inventory valuation adjustment
**Vehicles include all cars, trucks and buses

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, annual issues; Motor Vehicle Manufacturers Association, Motor Vehicle Facts and Figures, annual issues